JPRS 77693

27 March 1981

Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

No. 88

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NEW LAWS PLANNED TO BOLSTER NUCLEAR POWER INDUSTRY

Confidential Report

Melbourne THE AGE in English 3 Mar 81 p 1

[Article by Simon Balderstone]

[Text] Canberra.--The Federal Government is planning legislation to cater for a full nuclear power industry in Australia.

An interdepartmental committee which has reviewed the Atomic Energy Act says in a confidental report that the act is no longer appropriate for "the development of an Australian nuclear industry", and should be scrapped.

The committee says the defence and security-related provisions of the act "should not interfere with the envisaged commercial development of an Australian nuclear industry". It also says that new regulations may need to be developed "at an early date in view of the long lead time in establishing nuclear facilities such as power stations".

A copy of the report has been leaked to the Opposition spokesman on Urban and Regional Affairs, Mr Uren. It has been passed to THE AGE. It was sent to State Governments late last year.

Mr Uren said yesterday that the overriding concern of the report was that impediments in the Atomic Energy Act to the development of a nuclear industry be overcome, but there were indications in the report that some of the proposed legislation could be introduced in the present session of Parliament.

Opposition

The Government could expect vigorous public opposition to any attempt to push through such legislation before the new Senate came in, Mr Uren said. It could expect a "broad coalition", including the ALP and the Democrats (who will hold the balance of power after 30 June), to oppose any move to set up a nuclear power industry.

The review, set up last August after complaints from State Governments that the Atomic Energy Act gave the Commonwealth too much power, concludes that:

Non-proliferation legislation should be enacted "as a matter of urgency to provide a clear basis for meeting the Commonwealth's nuclear non-proliferation obligations which are a key element in obtaining public acceptance of developing a nuclear industry in Australia;

Such legislation be enacted "at the earliest opportunity" to cater for the urgent transfer to Australian industry of sensitive nuclear technology from overseas. The report says that it is possible that "early next year (1981), before this review is completed, a decision to proceed with a detailed feasibility study on the establishment of a commercial enrichment industry would necessitate this transfer of technology";

The secrecy provisions of the Atomic Energy Act are inadequate. "The principal area not apparently covered by existing legislation is the protection of sensitive information once it is within the private sector or if it is developed there," it says;

Another issue requiring further attention is "provision for nuclear damage". There was a need for "consideration of this matter to be expedited, having regard to the possibility of relatively early development of further nuclear activity such as enrichment";

It would be "important to see that any transfer of control from the Commonwealth to the Northern Territory was effected in a way that would not diminish the Commonwealth's powers to fulfil its undertakings given in 1977". (Following the conclusions of the Fox uranium report.)

The report says nuclear non-proliferation legislation should be given high priority and should include an Australian safeguard office as a statutory body. To meet international nuclear non-proliferation obligations, the Commonwealth must be able to "account for and control nuclear materials which attract safeguards," it says.

Further Details

Sydney THE SYDNEY MORNING HERALD in English 3 Mar 81 p 1

[Article by Paul Kelly]

[Excerpts] Canberra.--A confidential Federal Government report outlines a legal framework for the establishment in Australia of a full nuclear industry including power stations and enrichment plants.

The report says: "If Australia were to proceed with the establishment of conversion/enrichment or nuclear power generation facilities, it would be necessary to provide a legal basis for regulating the siting, construction, operation and decommissioning of those facilities.

"Responsibility for health, safety and environmental aspects of electricity generation falls within the traditional preserve of the States...Regulations may need to be developed at an early date in view of the long lead time in establishing nuclear facilities such as power stations.

"The establishment of a licensing and regulatory regime covering these activities will require a national approach involving close co-operation between the Commonwealth and the States and the Northern Territory."

The committee points out that a decision will soon be made on whether to proceed with a detailed feasibility study on the establishment of a commercial enrichment industry.

This would involve extensive overseas evaluation of the gaseous diffusion and centrifuge methods of minimum enrichment and the need to protect sensitive nuclear technology.

The committee says that new non-proliferation laws should "be enacted at the earliest opportunity."

It says laws are also needed to cover movements of yellowcake within Australia.

CSO: 5100

UNIONS ACT TO HALT EXPORT OF URANIUM IN MARCH

Sydney THE SYDNEY MORNING HERALD in English 7 Feb 81 p 3

[Article by Keith Martin]

[Text] Union bans threaten to halt uranium exports from Australia early next month.

A meeting of uranium industry unions, called by the ACTU in Sydney yesterday, backed a decision by the 50,000-member Australian Railways Union to ban the carriage of yellowcake (uranium concentrate) and supplies into and out of Australian uranium fields.

The meeting was also told that the Seamen's Union of Australia had banned all uranium shipments out of the country.

Yesterday's decision is the first positive move by the trade union movement against the uranium industry since the last ACTU Congress in September, 1979, adopted a strong anti-uranium policy.

At present only two mines--Mary Kathleen in Queensland and Nabarlek in the Northern Territory--are producing yellowcake

The ARU ban would have a drastic effect on Mary Kathleen and could lead to an early confrontation between the unions and the Queensland Government.

The decision of the meeting yesterday was to "note the report of the ARU and commend it as being in terms of ACTU policy."

The resolution declared that if "any action" is taken against an affiliated union for carrying out the ACTU anti-uranium policy, then a further meeting of the combined unions will be called.

According to union officials who attended yesterday's meeting, this amounts to a clear implication of industrial action by other unions if State Government rail authorities try to discipline the railmen.

The ARU, which is the largest of the rail unions, requested yesterday's meeting to test support for its uranium ban, which was decided on by its Federal council last year.

Mary Kathleen produces about 800 tonnes a year, which is sent by rail from the mine for export through Brisbane, Townsville and Sydney.

Most mining supplies also go into Mary Kathleen by rail--including large amounts of sulphur, which is essential for the uranium refining process.

Nabarlek began production early last year and is expected to produce about 1,500 tonnes of yellowcake a year.

The yellowcake is taken by motor truck to Darwin for shipment overseas.

Last November, while the Darwin branch of the Waterside Workers' Federation had a ban on loading yellowcake on to ships, transport workers loaded it on to a barge, which was sailed to Singapore by members of the Seamen's Union.

CSO: 5100

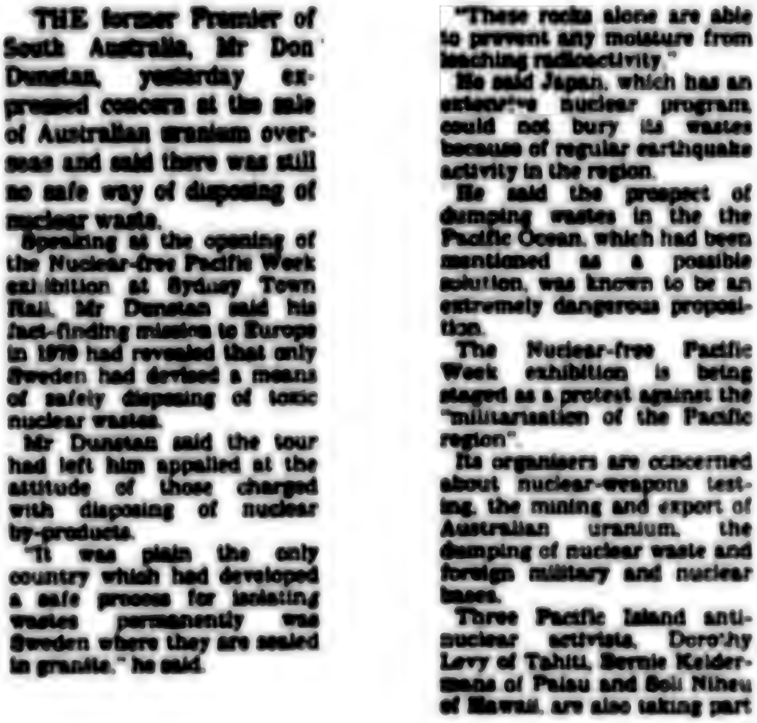
AUSTRALIA

NO SAFE DISPOSAL OF NUCLEAR WASTE, SAYS FORMER PREMIER

Canberra THE AUSTRALIAN in English 2 Mar 81 p 3

[Article by Bill West]

[Text]



THE former Premier of South Australia, Mr Don Dunstan, yesterday expressed concern at the sale of Australian uranium overseas and said there was still no safe way of disposing of nuclear waste.

Speaking at the opening of the Nuclear-free Pacific Week exhibition at Sydney Town Hall, Mr Dunstan said his fact-finding mission to Europe in 1979 had revealed that only Sweden had devised a means of safely disposing of toxic nuclear wastes.

Mr Dunstan said the tour had left him appalled at the attitude of those charged with disposing of nuclear by-products.

"It was plain the only country which had developed a safe process for isolating wastes permanently was Sweden where they are sealed in granite," he said.

"These rocks alone are able to prevent any moisture from leaching radioactivity."

He said Japan, which has an extensive nuclear program, could not bury its wastes because of regular earthquake activity in the region.

He said the prospect of dumping wastes in the the Pacific Ocean, which had been mentioned as a possible solution, was known to be an extremely dangerous proposition.

The Nuclear-free Pacific Week exhibition is being staged as a protest against the "militarisation of the Pacific region".

Its organisers are concerned about nuclear-weapons testing, the mining and export of Australian uranium, the dumping of nuclear waste and foreign military and nuclear bases.

Three Pacific Island anti-nuclear activists, Dorothy Levy of Tahiti, Bernie Keldermans of Palau and Soli Niheu of Hawaii, are also taking part

CSO: 5100

UNION ACTIONS AGAINST URANIUM MINERS REPORTED

Brisbane THE COURIER-MAIL in English 28 Feb 81 p 4

[Text] The Australian Railways Union has deferred bans against the Mary Kathleen uranium mine.

The union was to have imposed bans from March 1, preventing the haulage of commodities for the mine.

But the union's Mount Isa members refused to impose the bans and ARU members met in Townsville last night to review the matter.

The union's state secretary, Mr Pat Dunne, said yesterday the union would still impose bans against the mine, but when, and by what method, remained to be determined.

Meanwhile, the Australian Telecommunication Employees' Association has communications bans in force against the company proposing to start a uranium mine at Ben Lomond, 60 km west of Townsville.

The union's state secretary, Mr Ian McLean, said the union imposed the bans about two weeks ago at Minatome's Ben Lomond mine site, and at the company's Townsville and Sydney offices.

He said no connections were being made into any of the Telecom networks, and a radio link to Ben Lomond would not be provided.

"It is much more difficult to stop a mine already operating than to prevent a mine from getting under way, and that's what we are trying to do at Ben Lomond," he said.

CSO: 5100

URANIUM PRODUCTION CAPACITY DUE TO EXPAND SIGNIFICANTLY

Canberra THE AUSTRALIAN in English 6 Feb 81 p 7

[Article by Ian Perkin: "Yellowcake's Rosy Future"]

> [Excerpts] Uranium looks to be the power of the future, despite the safety questions which have come to be associated with development of its use.

On the coast of southern Japan, the two nuclear reactors that make up the Tokai No 2 power plant stand side by side, stark against the coast and in sharp contrast to the traditional landscape.

The Japanese engineer assigned to escort visitors around the plant, Mr Masanori Miura, speaks proudly of the design of the plants and the high technology involved in their construction.

Mr Miura is one of many in energy-poor but industrially-rich Japan who believe nuclear power is the way of the future, despite uncertainties which have punctuated its history

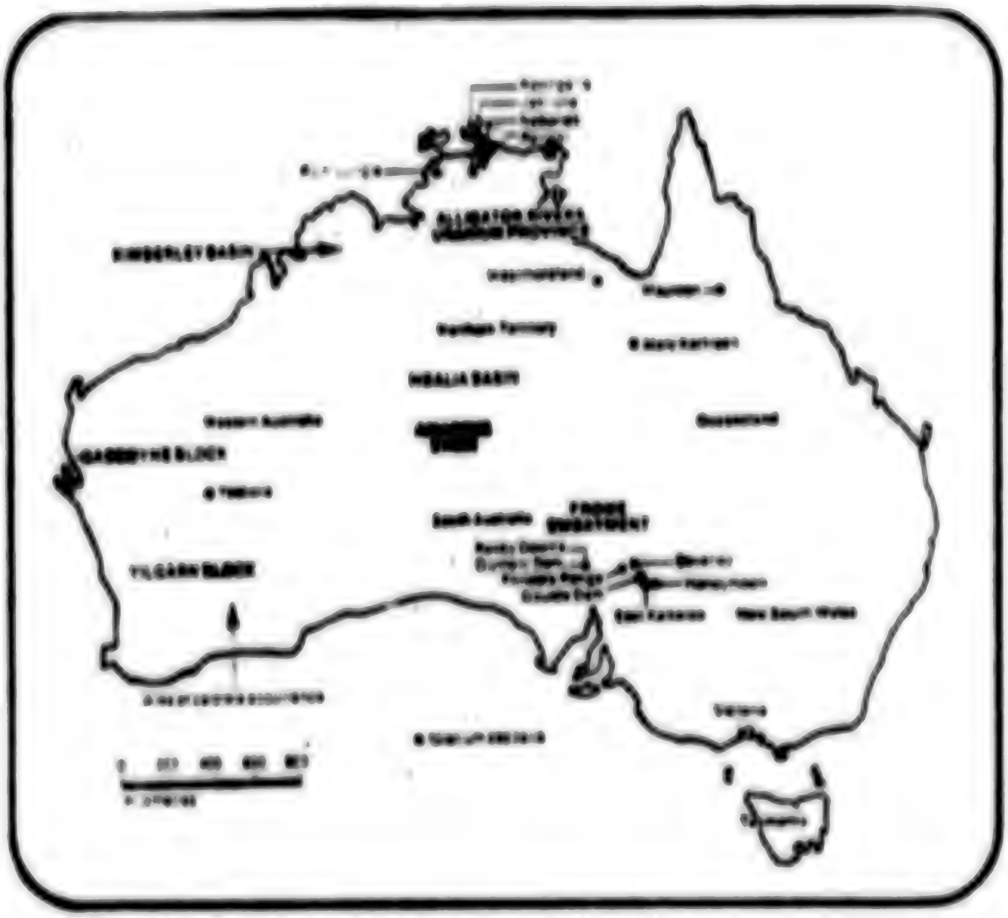
Some of the same belief in the future of nuclear power was shown in Australia late last year when local investors literally rushed the biggest float in the country's history.

Underwriting sharebrokers of the $57.5 million public issue Energy Resources of Australia Ltd (ERA), now the developer of the huge Ranger uranium prospect in the Northern Territory, had to ration shares among their regular clients.

The ERA float, hastily organised after the Federal Government decided to withdraw as a participant in the Ranger project, was a bid by the other partners to keep a high Australian equity in Ranger.

It was a reflection of the desire by the Government and the industry to keep the highest possible level of local participation in what will be one of the country's boom industries.

As a result, the Ranger deposit is now owned 75 per cent by Australians, as is required by the Government, and 25 per cent by overseas interests who will not only buy uranium from Ranger, but also provide development capital.



URANIUM deposits and areas geographically favorable for uranium discoveries

The shareholders in ERA are now EZ Industries and Peko-Wallsend, the original participants, each with 30.49 per cent, the Australian public with 14.02 per cent through the float, the Japan Australia Uranium Resources Development Co Ltd 10 per cent, the German group, Rheinbraun Australia Pty Ltd 6.25 per cent, UG Australia Developments Pty Ltd 4 per cent, Interuranium Australia Pty Ltd 3.75 per cent and Oskarhamnsverkets Kraftgrupp Aktiebolag (OKG) of Sweden, 1 per cent.

But Ranger is just one of the huge uranium projects now getting underway in Australia in what will prove to be a massive development of the industry during the 80s.

On August 25, 1977 the Prime Minister, Mr Fraser, announced that the Government had decided to proceed with the further development of uranium resources under strictly-controlled conditions.

Benefit

The decision brought with it a degree of criticism. It is clear Australians, including unionists, are fairly evenly divided over uranium development and export of uranium oxide.

A survey late last year by the Clemenger advertising group revealed that 59 per cent of unionists thought the export program would be to the country's benefit.

This is despite some antiuranium militancy in the Labor movement, which has resulted in the occasional serious split between those who believe in uranium exports and those who oppose them.

But the split in the community is something that will have to be solved if the development of the uranium industry is to proceed smoothly in the years ahead.

And this involves not only the mining, processing and export of uranium oxide, or yellowcake, but also the consideration of a uranium enrichment plant in the near future and, in the longer term, the probable construction of nuclear power plants.

That there is strong international demand for our uranium is without doubt, as these recently-signed contracts show:

--A $125 million contract for the sale of 3150 tonnes of uranium oxide between 1982 and 1986 with the Swedish power utility OKG, which is the newest and smallest partner in ERA's Ranger project.

--Earlier contracts worth about $2000 million signed by ERA for the supply of 34,0000 tonnes of Ranger uranium oxide over 15 years between 1982 to 1996 to the German and Japanese utility companies which are shareholders in ERA.

--Queensland Mines Ltd's $60 million contract to sell 816.5 tonnes of uranium oxide to Finnish utilities from its Nabarlek deposit over nine years from 1982.

--Separate contracts worth $156 million by the ERA partners, Peko-Wallsend and EZ Industries Ltd, to supply the American Electric Power Co with 2041 tonnes of uranium oxide, also over nine years from 1982.

Other contracts have also been signed with Korean and Japanese interests, and negotiations are underway with several European and north American users.

Moreover, with the drop in the world uranium price over the last year from $US43 a pound to about $US30 a pound, local producers believe they now have the opportunity to sign even more contracts.

They say that while the uranium price was high there was a reluctance of buyers to commit themselves. Now it has fallen, they are showing more interest in the market.

Capacity

It is expected Australia could supply up to a sixth of the world's total uranium needs by the mid-80s, and capture an even larger share after that.

Australia is expected to have a production capacity of between 8000 tonnes and 12,000 tonnes annually by 1985 from the major local uranium mines, which are:

--Ranger (Jabiru), about 230km east of Darwin and now operated by the newly-floated ERA group, with reserves of 100,350 tonnes of uranium oxide.

--Jabiluka, 200km east of Darwin and owned by Pancontinental Mining and Getty Oil, with 207,000 tonnes of uranium oxide.

--Nabarlek, 270km east of Darwin, owned by Queensland Mines Ltd with 12,000 tonnes of uranium oxide.

--Koongarra, previously owned by Noranda Australia, but now sold to Denison Mines of Canada, is about 50km south of Pancontinental's Jabiluka find and contains 13,000 tonnes of uranium oxide.

--Yeelirrie, in Western Australia, which is being developed by Western Mining Corp, the discoverer, Esso Exploration and Production, and Urangesellschaft of West Germany. It has reserves of 47,000 tonnes of uranium oxide.

--Mary Kathleen, in Queensland, the oldest operating mine in Australia, but which only has an estimated life of another four years unless additional reserves are discovered.

--Roxby Downs, in South Australia, which was discovered by Western Mining Corporation and is now being explored and assessed by them in partnership with BP Australia.

Other prospects include the Honeymoon prospects in South Australia where consortium members are planning a unique solution mining technique; Beverly, Goulds Dam and East Kalkaroo also in South Australia; Minindi Creek, Lake Way, and Thatchers Soak in Western Australia; and Westmoreland, Maureen, Ben Lomond and others in Queensland.

MIM Holdings has also found a potentially economic concentration of uranium after testing a sedimentary lake deposit at Lake Maitland in the Wiluna area of Western Australia. Estimated uranium oxide reserves now stand at 3500 tonnes.

And MIM's further exploration effort with joint venturer, Uranerz Australia Pty Ltd in the Amadeus basin, has uncovered reserves of more than 7700 tonnes of uranium oxide. MIM is also exploring for uranium in the Narlaby area of the Eyre Peninsula in South Australia.

Bridge Oil Ltd, Kratos Uranium NL, Minatome Australia Pty Ltd and Wyoming Mineral Corp. also have a potentially exciting deposit in the Pandanus Creek area of the Northern Territory. No reserves for the area are yet available.

The uranium exploration effort is continuing at a pace not seen since the 70s, and will ensure the country's future as a major exporter of energy through the 80s and beyond.

CSO: 5100

MORE AUSTRALIAN URANIUM TO BE PROCESSED IN SOVIET UNION

Canberra THE FINANCIAL AUSTRALIAN in English 2 Feb 81 p 1

[Article by Wio Joustra: "Russia To Process Our Uranium"]

[Text] MORE Australian uranium will be reprocessed in the Soviet Union following a nuclear safeguards deal to be concluded soon with Euratom.

Government officials are confident a nuclear safeguard agreement with the European Economic Community's atomic energy body will be concluded before the end of the financial year.

The final negotiating round between the Government and Euratom officials is likely to take place in Canberra in March.

The agreement will pave the way for substantial supplies of Australian yellowcake later this decade to the Euratom member countries. Of the 10 members, six produce nuclear energy — France, West Germany, Britain, Holland, Belgium and Italy.

They all have part of their uranium reprocessed in the Soviet Union and the US.

The safeguard agreement with Euratom is expected to include a clause under which Australia has to give prior consent to the transfer of its yellowcake to non-Euratom countries.

Government officials say the enrichment of Australian uranium delivered to Euratom countries can only take place under an "all in-all out" mechanism.

This means a country buying Australian yellowcake can have it enriched for energy purposes only in a third country provided it receives the equivalent amount of enriched uranium back in return.

Under this policy, no nuclear material coming from Australia will remain in the third country.

In the middle of last year the Federal Government concluded an agreement with Finland allowing the enrichment of Australian uranium in the Soviet Union under the all in-all out mechanism.

But the Australian Government insists on being kept informed of the exact details of the nuclear fuel cycle in each of its customer nations.

Government officials are also confident the European nuclear powers want to diversify their uranium imports and that Australia will play a major role in their nuclear energy programs.

Euratom is now closer to an agreement with Australia, which is regarded as a stable and reliable supplier, than it is to new agreements with Canada and the US.

Both countries have insisted on renegotiating their old and virtually unconditional safeguard agreements.

Canada stopped its uranium supplies to Europe three years ago to force Euratom into renegotiating the agreement.

The Europeans are known to favor Australia's tough but consistent safeguards policy.

CSO: 5100

SAFETY GUIDELINES FOR WA URANIUM INDUSTRY CIRCULATED

Perth THE WEST AUSTRALIAN in English 31 Jan 81 p 27

[Article by Paul McGeough]

> [Text] Guidelines being drawn up for WA's infant uranium industry indicate the care that will be required to ensure the safety of workers and the environment.

Drafts of the guidelines prepared by a Federal and State committee are being circulated to the mining industry and trade unions for comment.

A federal code of practice on radiation protection in the mining and milling of radioactive ores has already been published.

Work is in progress for the implementation of the code under WA statutes when Federal legislative requirements have been met. This is expected to be in the next few months.

The code specifies standards procedures and measures to prevent or limit the risk of radiation to workers and the wider community.

The guidelines now being circulated, with more to come, are designed to help the implementation of the code.

They say that maximum safety could not be ensured without the understanding and cooperation of all people involved in any work.

Design and construction would provide some protection, but this would have to be supplemented by workers' knowledge of the hazards involved and their skill and conscientiousness in adhering to recommended procedures.

Day-to-day responsibility for protection would be vested in radiation safety officers who would be required to have a degree in science or engineering, and several years' experience in health physics.

They would also be required to have had experience in radiation measurement in a mine or mill associated with radioactive ores.

Every worker would have to be instructed on the health risks of ionizing radiation and the recommended safety procedures.

The guidelines say that employees should be classified according to the type of work they do. All workers in controlled areas, where radiation exceeds a given level, and those who work in many areas of a plant should be given the additional training.

The training should cover the hazards of radiation and its sources.

It should include external exposure, internal exposure to contamination by inhalation, exposure from contaminated surfaces and materials and ingestion with food and water.

The training should also look to internal exposure from radioactive gases, the long term hazards of radiation and the enhancement of the risk of lung cancer for smokers.

It should also inform the workers on safety signs and notices, personal hygiene, the use of monitoring devices, the wearing of protective clothing and equipment, procedures for changerooms, showers, laundries and areas for eating and smoking, and the cleaning of equipment used for handling ore, tailings and yellow cake.

Design

The guidelines also give ideas on the design and construction of facilities such as eating and smoking areas and wash and change-rooms.

The guidelines say that decentralised facilities in a plant might minimise the spread of radioactive material. Separate approaches to such areas should ensure that each worker had the minimum level of contamination before mixing with others.

Change areas should have separate rooms for dressing and undressing.

Laundries should be provided for washing contaminated clothes and there should be decontamination rooms for emergencies in controlled areas.

Waste water from the rooms should be regarded as contaminated and disposed through a retention dam and not directly into any natural waterway.

A meeting of the Trades and Labour Council this week referred the draft guidelines to its committees on occupational health and safety and environment and pollution.

It will seek more information from the Department of Resources Development, which is circulating the guidelines.

The TLC, in common with the ACTU, is opposed to the development of the uranium industries, but some unions, such as the Australian Workers' Union, have agreed to work in it.

CBO: 5100

SWEDISH FIRM BECOMES RANGER URANIUM OXIDE BUYER

Sydney THE SYDNEY MORNING HERALD in English 29 Jan 81 p 21

[Article by Robin Harris: "Swedish Utility Buys ERA Stake"]

> [Text] A Swedish electric power utility has been allotted the reserve 4.1 million "B"-class shares in Energy Resources of Australia Ltd and, at the same time, becomes a long-term buyer of ERA's Ranger mine uranium oxide.

Oskarshamnsverkets Kraftgrupp Aktiebolag (OKG) acquired the shares "at a premium above par" in a contract which will need the approval of the Foreign Investment Review Board.

It has also necessitated the formation of a bilateral safeguards agreement between Australia and Sweden to regulate and monitor the use of Australian yellowcake.

The deal, if approved, would bolster the total foreign participation in ERA to 25 per cent which was the figure proposed in the ERA prospectus before the company was floated late last year.

ERA was formed specifically to assume responsibilities for the Ranger uranium mine.

OKG has entered into an agreement to buy 2,858 tonnes of uranium oxide from ERA over 15 years from 1982 to 1996.

This appears to be additional to the 38,204 tonnes already revealed by ERA to have been contracted to customers over this 15 year term.

On that basis, ERA's yellowcake supply is now more than 91.2 per cent contracted to customers. This is based on the initial designed capacity of the Ranger treatment plant of 3000 tonnes a year.

ERA's directors are unanimous in withholding the price per tonne of the uranium oxide being earmarked for OKG.

But even the more puzzling is that the price of the ERA shares destined for OKG is also being withheld.

The "rational assumption," according to ERA's chief executive Mr Bernard Fisk is that the shares were acquired at a price between $1 per value and the current market price of $1.90.

The deal will have cost OKG at least $4.1 million or at the outside nearly $8 million, based on current market prices.

The ERA prospectus foreshadowed that the 4.1 million shares would be held in reserve and later issued "to an overseas utility who like the overseas participants, will enter into a long-term contract to purchase uranium concentrates from the company."

CSO: 5100

BRIEFS

NUCLEAR DRIVE IN S. AMERICA--Sydney.--The Federal Opposition Leader, Mr Hayden, yesterday warned that Brazil and Argentina appear to be close to producing nuclear weapons. On his return from an overseas trip, which included Peru and two other South American countries, Mr Hayden said he learned of substantial progress by Brazil and Argentina towards developing nuclear power for domestic energy. "Nuclear power generation is a pretext for establishing a nuclear weapons capacity," he said. "If Brazil and Argentina continue down the road--and they are already a good way down it--to nuclear weapons, then we'll see a proliferation of this problem." Mr Hayden reported growing concern among elements in both Brazil and Argentina that other states would turn into Latin America's "Vietnams," with signs already of growing military support for Right wing Governments by the Reagan administration in the US. Mr Hayden called on the Australian Government to increase pressure on states throughout the world to comply with the nuclear non-proliferation treaty. Mr Hayden said also were continuing human rights violations in Brazil and Argentina, although he acknowledged that there had been some improvement. [Text] [Melbourne THE AGE in English 7 Feb 81 p 10]

JABILUKA URANIUM--Darwin.--Formal talks are to begin between the Northern Land Council and Pancontinental Mining Ltd on development of the Jabiluka uranium deposit in the Northern Territory. The deposit is the biggest of four deposits in the uranium province, 250 kilometres east of Darwin. The NLC chairman, Mr Gerry Blitner, said yesterday that traditional owners had given approval for the talks at meetings at Ja Ja. Last week, the NLC announced it was entering formal talks with the Canadian-owned miner Denison Australia for development of the Koongarra deposit. Queensland Mines is already producing yellowcake at Nabarlek in the uranium province and Energy Resources of Australia is developing the nearby Ranger deposit. "The NLC has been instructed to retain experts to examine the mining project and its impact on the Aboriginal people," Mr Blitner said. [Text] [Brisbane THE COURIER-MAIL in English 28 Jan 81 p 16]

GORDON DOWNS URANIUM--The Gordon Downs Aboriginal community will not get the 200,000 hectares of land it is seeking from the WA Government because of uranium exploration in the area. The Minister for Lands, Mr Wordsworth, said yesterday that the exploration was one of the reasons why he had rejected a special lease application from the community last year. However, Mr Wordsworth said that temporary reserves for uranium in the area would not affect any Government plans to establish a settlement on a smaller piece of vacant crown land round Ringer's

Boak. The initial application had sought excisions from both the Gordon Downs and Coronado leases and the area of crown land. It was Government policy that pastoral leases remain as intact, viable economic units. The Aboriginal people did not want the land for pastoral purposes and the Government would not make such excisions for special leases from existing pastoral leases. The Mines Department would have objected to any proposal for a big special lease over temporary reserves. Pastoral activities did not affect the reserves. [By Paul Murray] [Excerpt][Perth THE WEST AUSTRALIAN in English 31 Jan 81 p 1

HIGH URANIUM VALUES--Drilling at the Pandanus Creek uranium prospect in the Northern Territory encountered "significant values of uranium and gold with minor silver," according to Bridge Oil's report for the December quarter. Bridge, with a 25 per cent interest in the area, was encouraged by drill holes assaying more than 1 lb of uranium a tonne. The best results came from hole WPD 60 where the interval 117-118m assayed 64.751b of uranium oxide a tonne, and 150g of gold a tonne. [Text] [Canberra THE FINANCIAL AUSTRALIAN in English 5 Feb 81 p 8]

RANGER EXPENDITURES--Expenditure on the Ranger uranium project to December 31 was $239,369,000. This excluded interest capitalised of $12,555,000. Energy Resources of Australia Ltd, the operating company, reported this yesterday. ERA said the cost and progress were substantially in accordance with budget and timetable respectively. The Ranger project consists of development of the open cut mine, tailings dam, water management system treatment plant infrastructure and the Ranger interest in the Jabiru township. The company said the delineation of No 3 ore body was progressing. [Text] [Brisbane THE COURIER-MAIL in English 7 Feb 81 p 13]

CAPE YORK URANIUM--The Olimin group had discovered a very good uranium prospect near Iron Range in Cape York Peninsula, chairman Mr Bill Siller, said yesterday. He told the annual meeting that a limited drilling program of 12 holes had located uranium mineralisation. Drilling would be resumed as soon as a drilling rig was available after the wet season. Mr Siller said that at the Beverly uranium deposit in South Australia, an exhaustive examination of in situ leaching as distinct from opencut mining was in progress. If this method of mining proved viable, the schedule called for the construction of a pilot plant in July this year. This plant would operate to establish optimum solution compositions and processes so that commercial operations could begin in January, 1984. [Text] [Brisbane THE COURIER-MAIL in English 13 Feb 81 p 11]

PACIFIC DUMPING FEARS--Melbourne--Community Aid Abroad yesterday said Australia accepted Japanese plans to dump radio-active waste in the Pacific. National director of the Australian aid organisation, Mr Harry Martin, said the Japanese planned to dump 10,000 drums of radio-active waste during the next three years. More than a million drums would be dumped in the next 10 years. Mr Martin said Pacific governments had sent pleas to the aid agency as part of a campaign to stop nuclear testing and dumping of the waste. "The Japanese government's attitude towards the Pacific people displays an imperialistic arrogance belonging more to the 19th century than the 20th," he said. "Instead of supporting the Pacific people, Australia has been lobbying hard to have these emergent nations water down demands for a nuclear-free Pacific." [Text] [Brisbane THE COURIER-MAIL in English 14 Feb 81 p 2]

SINGAPORE 'TAKE BACK WASTE' REQUEST--Singapore has formally asked the Australian Government to take back 100 drums of low-grade radioactive waste. A spokesman for the Department of Foreign affairs in Canberra said that the request from Singapore was received on February 4 and was being given urgent and sympathetic attention. The spokesman said that the material was originally from Western Australia. The West Australian Government would probably be asked to provide a site for the waste in WA. The drums contain residues and the lining from a Singapore furnace operated by the National Iron and Steel Mills to melt down a consignment of scrap metal from WA. The scrap metal was thought to have contained a radioactive measuring device missing from the Western Mining Corporation's Kambalda nickel operation since November 1978. [Text] [Perth THE WEST AUSTRALIAN in English 13 Feb 81 p 26]

NABARLEK URANIUM--Sydney.--The commercial start of the 12,000 tonne Nabarlek Uranium deposit a decade after its discovery gave Queensland Mines a $6.54 million profit for 1980. The result, which follows a $62,000 loss for 1979, carried the promise of much bigger things since it was made up of a June half-year loss of $6.28 million followed by a December half-year profit of $12.83 million. The dramatic turnaround rubbed off on Kathleen Investments (Australia) Ltd., whose half of the QM profit lifted its total operating earnings from $986,000 in 1979 to $4.23 million last year. Both companies are changing their balance dates from 31 December to 30 June and the next set of printed accounts will cover an 18-month period. QM, which had been meeting its Japanese sales contract commitments with yellowcake borrowed from the Australian atomic Energy Commission's stockpiles, began mill production at Nabarlek early in June and by the end of the year had produced 1006 tonnes of uranium oxide. The AAEC borrowings are now being progressively repaid, resulting in the proceeds for their sale paid to the Federal Government being returned to QM. At the end of 1979, the amount rapayable was $62.4 million. QM yesterday declined to reveal the end-1980 amount. QM has yet to formally spell out its dividend policy, but it is likely that the start of payments will have to await the repayment of the debt financing--$75 million at the end of 1979--to the two Japanese customers. [Excerpt] [Melbourne THE AGE in English 20 Feb 81 p 22]

A-TEST RADIATION PROBE--Canberra: Some Australians involved in British atomic-weapons testing in Australia in the 1950s have been interviewed as part of the Government's investigation in to the effects of radiation on people who took part in the tests. The Minister for National Development and Energy, Senator Carrick, said yesterday that those interviewed had responded to the Government's invitation issued in May 1980. "Accounts are being obtained of duties carried out in connection with the radiological surveys conducted after the tests," he said. "Discussions are also providing individual inquirers with information on the possibility of their exposure as a result of their involvement in the tests." Senator Carrick said that officers of the Department of Health and the Department of National Development and Energy conducted the first interviews in Melbourne, Sydney and Adelaid in November 1980. More interviews would be held in each mainland State capital in the next few weeks. [Text] [Perth THE WEST AUSTRALIAN in English 24 Feb 81 p 29]

KOONGARRI CLEARANCE--Canberra.--The Deputy Prime Minister, Mr Anthony, indicated last night that approval was near for the Koongarri uranium project in the Northern Territory. He told Parliament that the former Environment Minister, Mr Ellicott, wrote to him last month saying there were no environmental objections to the project subject to certain conditions. Mr Anthony told Mr Grant Tambling (NCP NT) the other main requirements for approval--conclusion of arrangements with traditional Aboriginal land owners and 75 percent Australian equity in the project--would be fulfilled. The Northern Land Council had said the traditional owners were prepared to begin formal agreement negotiations. Mr Anthony said the proposed developer, Denison Australia Pty Ltd, was wholly Canadian owned, but many Australian firms were willing to participate.

CSO: 5100

SCIENTIFIC PARLEYS HELD AT ATOMIC RESEARCH CENTER

Ion Implantation, Laser Treatment

Bombay THE TIMES OF INDIA in English 13 Feb 81 p 4

[Article by S. Kumar]

Now you have "cosmetics" to give a face-lift to semi-conductors, superconductors and alloys!

The technique of ion implantation is about to turn into reality the dream of low-cost solar cells. Warming up of the surface of materials by laser beams is the latest technology bringing forth alloys of the types hitherto unknown.

"These techniques are like cosmetics where one dresses up the surface using all artificial, but scientifically and technologically tenable, means. They could be made as palatable as technologists would like to have it" says the noted nuclear physicist, Dr. P. K. Iyengar at the Bhabha Atomic Research Centre here.

Ion Implantation

A few days ago, the nuclear physics division of the BARC, succeeded in producing the chromium-aluminium alloy for the first time in the world using the laser treatment and this alloy cannot be produced by any other method, according to Dr. S. K. Sood. The institute of physics at the University of Padova, Italy, collaborated with the BARC in this experiment which began in India 10 years ago. It may take another five years for the industry to absorb the technology.

This alloy will find uses in electrical switches, engineering tools, plastic moulds, ball bearings, and high temperature boilers. The lifetime of these tools will be at least 10 times higher than those made of the usual alloys and the cost of the special treatment is 10 times cheaper.

Having produced the molybdenum-copper and antimony-aluminium alloys in the laboratories, the nuclear physics division is working on more alloys of aluminium with cadmium, copper, thalium, nickel. The metallurgy division is conducting experiment in making tin-zirconium alloy for nuclear reactors and nickel-copper-steel alloy for corrosive resistant material.

The consensus at the five-day international workshop on "Ion implantation, laser treatment and ion beam analysis of materials" which began on February 9 at the

BARC was that these techniques held the future for cheap solar cells for terrestrial use. Charged particles can be imbedded into the pure silicon by shooting ions inside an accelerator. The damage caused to the chip can be healed by laser beams which just heat the required surface. Ion implantation and laser treatment are widely used in the industries abroad but they are in the laboratory stages in India.

Radiation Damage

Dr. S. Guha on the Tata Institute of Fundamental Research is studying the characteristics of amorphous silicon and in India this is the only experiment of its kind. Though major results have been achieved, total success can be claimed in the next couple of years. Once, amorphous silicon is produce in the country, it will help produce the solar cells at very cheap rates. The recently set up solar energy commission is keen on acquiring any technology leading to the production low-cost solar cells. [as published]

Over 1,200 ion implantation machines are working around the world now, according to Dr. G. Dearnaley of the U.K. Atomic Energy Agency at Harwell. In aerospace and military equipment, implantation techniques were being used in the U.K.

"Both in the U.K. and in India, a rich field of research in properties of materials has opened up in the universities and there is a great scope for new experiments." Dr. Dearnaley told THE TIMES OF INDIA. The BARC symbolised a good mixture of indigenous technology and the imported ones and some first rate modern equipment were made in India, he said. I am impressed with the capacity and wide range of equipment at the BARC," he added. [as published]

Dr. P. Mazzoldi of Padova, Italy, saw the possibility of making a special type of glass using ion implantation technique. The galss incubators could be used to overcome the problem of radiation damage in waste disposal. [as published]

The BARC scientists have entered into certain collaborative programme with the UK agency and experiments under this project would begin in the BARC in the next few weeks, according to Dr. Dearnaley.

Dr. Mazzoldi said there was no government-level scientific co-operation between Italy and India and his institute individually chose to work with the BARC at the institutional level.

Public Health, Pollution Control

Bombay THE TIMES OF INDIA in English 13 Feb 81 p 5

[Text] February 12: A two-day national symposium on "Applications of nuclear and allied techniques in public health and pollution control", organised by the department of atomic energy, was inaugurated at the BARC here today.

Dr. Nilay Chaudhuri, chairman, central board for the prevention and control of water pollution, in his keynote address listed some of the nuclear techniques as investigational tools in pollution control. The techniques were powerful and the avenues for their application were endless, he said.

Since, disinfecting agents like chlorine were feared to produce cancer-causing substances, nuclear techniques provided the suitable alternatives, despite their huge costs accordnig to Dr. Chaudhari. [as published] In Europe, ozone is replacing chlorine as the water disinfecting agent, he added.

In Bombay, a sewage disposal system is under consideration which envisages the outflow of waste water into the sea. This system now exists in Glasgow and Tel Aviv. Before adopting the system, a rational approach to solving the consequent environmental problems was necessary, he said.

Earlier, Dr. V. K. Iya, director, isotope group, BARC, welcomed the delegates. Mr. K. Krishnamurthy, convener, of the symposium organising committee, proposed a vote of thanks.

CSO: 5100

ATOMIC RESEARCH CENTER TO HAVE ULTRATRACE LAB

Bombay THE TIMES OF INDIA in English 17 Feb 81 p 3

[Text] India will have a fullfledged "ultra trace laboratory" at the Bhabha Atomic Research Centre here within the next few years, according to the chairman of the Atomic Energy Commission, Dr. H. N. Sethna.

The laboratory will generate a new level of analytical capability and help detect the trace of particles as small as a millionth of a millionth part of a gram (picogram).

Inaugurating the first internatinal symposium on "Trace analysis and technological development" at the BARC, Dr. Sethna said the centre had developed a high degree of competence in analysis at the trace level and the atomic energy programme owed a great deal to the important contribution made by the analytical chemists at all stages of development.

Referring to the role of trace analysis and the associated technology in environmental studies, Dr. Sethna said by analytical studies, one could identify polluted spots and assess the risk to the population, ultimately bringing down the level to an acceptable minimum.

In the nuclear industry, the contaminants were contained at the source and when inescapable, they were released to the environment with extreme care. "The very overcautious approach by the nuclear industry may be responsible for the public scare", he added.

Dr. M. Sankar Das, convener of the symposium, in his introductory remarks mentioned that the "purity" of materials changed along with the changing techniques of analysis. For example, the level of purity of aluminium established in 1961 was no more valid in 1964 and it vastly changed in 1981 because of the trace analysis. The spin-off of special materials with tailored purity came from the development of nuclear energy, micro-electronics and space communication.

Dr. H. W. Nurnberg from the Institute of Applied Physical Chemistry, Nuclear Research Centre, Juelich, Federal Republic of Germany, said the reliable trace analysis was a branch of significance in quality control in the pharmaceutical industry, medicine, biochemistry, study of human metabolism and in the protection of environment. International scientific co-operation in this field was essential, he said. Broad acceptance and acknowledgement of the results from the research and development, by the political decision-makers, was equally important, he added.

Mr. V. N. Meckoni, chairman of the organising committee, welcomed the delegates. Prof. S. C. Bhattacharya, vice-president of the Indian National Science Academy, also spoke. Dr. S. Gangadharan, scientific secretary, proposed a vote of thanks.

The four-day sympoisum, held for the first time in India in the last 30 years, is being attended by 250 delegates, including 20 leading analytical scientists from abroad. The symposium is supported by the International Union of Pure and Applied Chemistry, in addition to many Indian organisations.

CSO: 5100

SHIFT SEEN IN U.S. POSITION ON TARAPUR FUEL

Madras THE HINDU in English 12 Feb 81 p 8

[Article by N. Ram]

[Text] The U.S. position on fuel supplied for the Tarapur reactors insists that the "joint determination" clause in the 1963 agreement confers a "veto" power on reprocessing the spent fuel. But there is almost as clear an admission that a major shift has taken place on this question since the late 1960s--the time India provided design details to the United States on the power fuel reprocessing plant at Tarapur for implementing the clause relating to joint determination.

These emerged in interviews, on a non-attributable basis, conducted by THE HINDU with key men with longstanding official experience with the Tarapur affair.

"The future of U.S.-Indian nuclear relations is under review by the new administration and is the subject of ongoing discussions with the Indian Government," a State Department's spokesman said, meanwhile, in a written reply to the inevitable question concerning Senator John Glenn's letter to President Ronald Reagan on Tarapur.

He explained that pending the conclusion of "this process of review and discussion", it would not be appropriate to "comment or speculate further."

The U.S. official added that the views of Mr. Glenn and of "others in Congress involved in these matters" would be taken into account in deliberations by the Reagan administration on the future of Indo-U.S. nuclear relations.

If the State Department cannot say anything specific on Tarapur at this moment, the interviews highlighted the change and hardening of U.S. positions over a 15-year period on two fronts of the 1963 agreement for nuclear cooperation--reprocessing of U.S.-origin spent fuel as much as the fuel supply itself.

On the issue of reprocessing, the U.S. side sent India a most interesting letter in October 1968, signed by Mr. Myron B. Kratzer, a senior official who was handling international affairs for the then Atomic Energy Commission.

In effect, the official communication to India was that the design of the proposed reprocessing plant at Tarapur would allow "effective" application of safeguards as envisaged by the original agreement. The understanding at that time was that upon construction of the plant, U.S. officials would visit it to confirm adherence to the design submitted earlier.

Documentary Proof

The Kratzer letter provides documentary evidence that cannot be wished away by the United States on how liberally "joint determination" used to be interpreted under the cooperative agreement. It supports India's contention that no "permission" or "prior Approval" is required for reprocessing spent Tarapur fuel under the 1963 agreement and that there is no question of a "veto."

"Joint determination" does not relate to the decision to reprocess, which is India's prerogative: it covers merely the safeguardability of the reprocessing facility.

Confronted with this information, one of the U.S. "Tarapurmen" responded by repeating a general assertion rather than arguing the point. "I don't know how you can interpret 'joint determination' without concluding there was a 'veto' power. He fenced off the line of enquiry.

Q: Did not the original U.S. position (as documented in the Kratzer letter) recognise that joint determination was merely to establish safeguardability of the reprocessing facility, and also that the design provided by India was consistent with the effective application of safeguards?

A: Design is not the only ingredient in a joint determination.

But "without any regard to Tarapur" there was an additional point made. In U.S. policy as well as worldwide perceptions, there was "a growing recognition that reprocessing is a difficult, a very sensitive operation in the non-proliferation sense of the word--to safeguard."

But he could not resist one explicit reference to Tarapur: "This is why reprocessing is treated separately from any fuel cycle activities." He added that the question was increasingly underlined: "Can a reprocessing plant be effectively safeguarded?"

Unequivocal Yes

The answer provided in 1968 by the Kratzer letter is an unequivocal "yes." This is also the question Senator John Glenn (along with a former Senator, Mr. Abraham Ribicoff) has raised repeatedly in the debate over U.S. nuclear non-proliferation policy.

In the two courses supposed to be open to make a non-NPT recipient of American nuclear fuel submit to the "non-proliferation" regime "withholding fuel or...continuing to make supply conditional on agreement not to separate plutonium from the fuel once it was spent"--these critics of U.S. nuclear exports have favoured the first "strategy."

From a purely U.S. standpoint, they are probably entitled to savour the vindication of their argument as opposed to the inconsistent and vacillating official policy dramatised by the Kratzer document.

'No Give, Only Take'

About the policy, an independent analyst, Richard Betts, has this to say in a chapter titled "India, Pakistan and Iran" that is part of a new study on "non-proliferation and U.S. foreign policy" supported by the Brookings Institution: "American non-proliferation policy in South Asia has little to show...The problem is that American policy has been dominated by a desire to control the local diffusion of sensitive technology and by unwillingness to take strong initiatives to weaken strategic incentives for nuclear weapons...

"The United States appears to take South Asian security concerns seriously only when they become a central element on global conflict between the superpowers. As a result, U.S. policy strikes the targets as not only erratic and undependable, but also arrogant and offensive, applying double standards, seeking to take but not give, and threatening illegal action (Abrogation of fuel supply contracts with India).

When his attention was drawn to this assessment, one of the "Tarapurmen" this correspondent interviewed said: "I would shy away from any strong characterisation of one side or another."

Charge of 'Blackmail'

Asked about characterisations in the U.S. Congress and the media of India's "blackmail", he suggested, "It is undesirable to characterise these things in strong terms. It is best to try to seek common ground."

(The strongest and wildest of these spreading characterisations of "India's nuclear blackmail" appeared in a WALL STREET JOURNAL editorial on Tuesday. It assailed India for its "effrontery", breaking bilateral agreement with the U.S., continuing to show "disdain for our nuclear nonproliferation policy by refusing to permit complete international inspection", and "bragging about plans to produce more weapons-grade uranium.")

(It assailed Mr. Jimmy Carter for his "ignonimious handling of nuclear nonproliferation policy" and the International Atomic Energy Agency for consenting to India's reprocessing of fuel, presumably under safeguards for safeguarded nuclear material.)

(It called upon Mr. Ronald Reagan to send out "a clear signal that he is unafraid of using American clout...to restrain the wild passions of the Indians.")

Incidentally, Mr. Myron B. Kratzer went on to become Deputy Assistant Secretary of State and to record his revealing opinions in hearings before the U.S. Nuclear Regulatory Commission as late as 1976. He resisted suggestions for cutting off Tarapur fuel supplies as a retaliation against the peaceful nuclear explosion (PNE) of May 1974, because this would weaken U.S. "credibility" as a reliable supplier.

The ultimate concession Mr. Kratzer would make then to the "withholders" was that a threat of stoppage after a second Indian explosion could be made provided there was "a clear affirmation that this was the only reason for which fuel would be cut off."

Reliability

There has been no Indian PNE since that one in 1974. But there is the U.S. Nuclear Non-Proliferation Act of 1978, which chokes off export of nuclear special material, components and sensitive technology to countries such as India and imposes a "veto" on reprocessing U.S.-supplied fuel.

Mr. Kratzer retired from the State Department a year before that piece of legislation was enacted and works with a private consulting firm specialising on international energy (including nuclear) issues.

The official letter he signed and sent to India remains a classified document. The legal position he indicated or gave away on reprocessing is being denied, or at more sophisticated levels, treated cattily. The concern he sounded over "reliability" as a supplier has gone through a chequered career recently within the executive branch and Congressional process in this country.

CSO: 5100

U.S. STAND ON TARAPUR FUEL ANALYZED

Madras THE HINDU in English 15 Feb 81 p 2

[Article by G. K. Reddy]

[Text] The running controversy with the United States over the supply of nuclear fuel for the Tarapur plant, which has become a major irritant in Indo-American relations, assumes political overtones every time India asserts its right to exercise other options, if the U.S. goes back on its contractual obligation. The recent press reports that India might terminate the agreement in such a situation have led to a lot of furore in the U.S. as though it was India that was breaking the contract.

A few well-meaning but self-opinionated U.S. crusaders against nuclear proliferation have been crying wolf that, under the guise of exploring alternative fuel mixtures, India was in effect attempting to acquire the capability for utilising this knowledge for potential military uses.

The Right to reprocess the spent fuel at Tarapur is being misinterpreted as a diabolical attempt to acquire and stockpile weapon-grade plutonium, without any international constraint on its uses for peaceful or non-peaceful purposes, in the wake of Pakistan's bid to make the bomb in the near future.

Credible Distinction

The missing perspective in this anti-Indian campaign cannot be restored by India merely through a self-righteous reassertion of its right to reprocess the wastes or explore other fuel alternatives for its nuclear power programme. It can be done only through a painstaking clarification of the country's nuclear objectives and its continued commitment to non-proliferation.

A credible distinction has to be kept up between the advocacy of its legal contention that the U.S. has no justification at all for a unilateral repudiation of an international obligation on the strength of its domestic legislation, and the articulation of the view that the U.S. has no political or moral sanction to attempt to impose completely one-sided and highly discriminatory restrictions on India's legitimate aspirations for developing and using nuclear energy even for peaceful purposes.

Absurb Talk

The sad part of this unfortunate controversy has been that the world attention is being diverted from India's impressive achievements in the field of nuclear science to potential utilisation of this knowledge for non-peaceful purposes in future, however remote it might sound at present.

It is absurd to talk of any possible threat to world peace through horizontal proliferation to an extent that their total destructive strength is estimated at more than a million Hiroshima type bombs, the equivalent of about three tons of TNT for every man, woman and child on earth, as the U.N. Secretary-General, Dr. Waldheim, pointed out in his address to the commemorative session of the non-aligned Foreign Ministers' conference.

It is in India's own interest to elevate the level of its controversy from the U.S. to a higher plane, from the narrow legal plane to a lofty human angle, to focus world attention on the culpability of the big powers in promoting proliferation, while quibbling over safeguards to exert pressures on developing countries and deny them the right to acquire nuclear knowledge for peaceful uses.

A Tarapur Summer

If the prolonged debates in U.S. Congress last summer on the pending shipments of enriched uranium had transformed last June, July and August into a Tarapur summer in Washington, India could not escape its share of responsibility for allowing this to be treated as a bilateral squabble, instead of focussing attention on the more fundamental aspects of the proliferation problem.

From the very beginning, the big powers have been opposed to the very concept of developing countries going in for nuclear energy which in their view was a highly expensive luxury which the poor nations could ill-afford. They scoffed at the idea of a country like India leaping forward from the cow dung era into the nuclear age even with external assistance.

The advice to India was to concentrate on growing more food to feed its hungry millions than frittering away its limited resources in pursuit of this status symbol which, it was told, was beyond the country's grasp at that time.

It was only in 1955, at a conference in Geneva, that Dr. Homi Bhabha was able to convince the West that developing countries needed atomic power as much as the developed ones for covering the intermediate stages of their development.

A year earlier, Britain offered to give India on loan some enriched uranium fuel elements for building what was then described as a swimming pool type reactor for experimental purposes. [as published]

First Reactor

India was told that it would have to build the reactor, including civil engineering work, designing of the tank, and electronics for control systems entirely from its own resources. It was supposed to be built in competition with the Lido type reactor in use at Harwell in Britain.

The Indian nuclear scientists accepted the challenge and completed the construction of the reactor by 1956. It was the first nuclear reactor in Asia, built indigenously except for the fuel elements provided by Britain. This experimental reactor located at Trombay was named Apsara which became a showpiece in those days when nuclear energy for developing countries was still in the realm of an ambitious aspiration.

But it is not generally known that the basic knowledge about reactor materials and controls, neutron physics and other applied nuclear sciences was obtained with French assistance, when no other power was prepared to share such secrets. The close contacts that Dr. Bhabha had with European scientists helped to get this cooperation agreement with France.

Canadian Offer

Then Canada came forward with a generous offer of help under the Colombo Plan to help India build an NRX type experimental reactor, which was subsequently named Cirus, based on natural uranium and heavy water modulation. Though Dr. Bhabha favoured the lido type, an enriched uranium and heavy water system that was then in operation at Harwell, he was persuaded by his colleagues to go in for an NRX type at that stage of Indian atomic development.

A third experimental reactor named Zerlina was built by 1961 entirely from Indian resources. The experiments carried out by India proved that it should be possible to break even with BWR reactors operating on what was described as light water enriched systems. The subsequent evaluations led to the choice of heavy water modulated, natural uranium reactors for the Rajasthan, Kalpakkam and Narora nuclear power plants.

Simultaneously, India took steps to set up technical centres to train its scientists in the complexities of operating high flux nuclear reactors, besides establishing radio-metallurgical research laboratories which now rank among the best in the world.

The country also embarked on highly sophisticated studies in various aspects of solid state physics, transuranium chemistry, isotope preparation and biological research including genetics and mutation.

Plant at Trombay

It was the establishment of a reprocessing plant at Trombay, after the Canadian-assisted Cirus reactor became critical, that caused some stir in nuclear circles abroad, since it gave India in theory the nuclear option.

The decision to set up this plant was taken at the very start of the Cirus construction, because India wanted to acquire the capability for producing at least half the fuel required for this reactor by recycling the spent elements.

The Canadians doubted the capacity of Indian nuclear scientists, but wished them well with an assurance that, if they failed to succeed, India could still count on Canada to supply the fuel for it.

When Dr. Bhabha decided to seek American assistance in setting up the first nuclear power plant at Tarapur using enriched uranium, some serious doubts were expressed by his senior colleagues about the political and technological implications of going in for a process that would make India totally dependent on the U.S. for the supply of fuel during the life-time of this plant.

Though it was not beyond India's capability to enrich natural uranium, the process involved heavy capital investment which could not be justified for producing fuel for only one or two power plants unless the country wanted to embark on a weapon programme. It was India's aim from the very beginning to utilise its vast monazite sand deposits to produce thorium for nuclear power generation.

A Major Political Problem

But since it involved highly complex technological problems which could not be mastered until enough research had been done on the fast breeder programme for irradiating thorium with U-233 using neutron spectrum, it was felt that India should concentrate on natural uranium as intermediate fuel till at least the turn of this century for its nuclear power generation. So by the technological mistake made in choosing for Tarapur enriched uranium that could not be economically produced in this country, India had burdened itself with a major political problem.

The tendency of looking upon the mounting U.S. pressures to submit its entire nuclear programme to full-scope safeguards as the price that India must pay for continued supplies of enriched uranium for Tarapur as primarily a legal problem involving the violation of a contractual obligation has further complicated the political aspects of it.

The country has to view this primarily as an unmistakable attempt to deny it the opportunity to develop nuclear energy on its own without forsaking this right in the name of non-proliferation.

The complex political and technological issues involved in this controversy are much more fundamental than the legalistic or moralistic excuses being advanced by the U.S. for going back on a contractual obligation.

U.S. Accusation

The Indian move to disengage itself from this controversy by terminating the agreement, is the only sensible course open to it in these circumstances, if the U.S. is bent on violating its commitment. The legal aspects of India's case are being overshadowed by the political factors that have led to a marked hardening of the American attitude.

The whole controversy is assuming such a topsy-turvey character that some sections of opinion in the U.S. have started accusing India of violating the spirit of the agreement in asserting its right to reprocess the spent fuel or run the Tarapur reactors with alternative fuel mixtures. It is quite clear that the U.S. does not want India to become self-sufficient in its nuclear programmes even under the existing safeguard arrangements.

After the Pokhran test in 1973, it was Canada that suspended its nuclear cooperation with India saying that India had used the Canadian-built facilities at Trombay to irradiate the materials used in this explosion. The U.S. raised no such objection and, on the contrary, it reiterated its contractual obligation to supply enriched uranium for Tarapur till 1993 under the 30-year agreement on the basis of the safeguards provided in it.

The demand for full-scope safeguards on India's entire nuclear programme, not merely the Tarapur installations, had nothing to do with the fact of the Pokhran test. The nuclear non-proliferation law was enacted by the Carter administration to unilaterally impose full-scope safeguards on countries like India irrespective of its pending commitments on the strength of domestic legislation.

The real U.S. objection is to the remarkable progress made by India in its nuclear programme, starting with its uranium mining operations, experimental reactors, heavy water plants, fuel fabricating, reprocessing facilities, research and training establishments which have enabled the country to proceed step by step towards a fast breeder programme based on thorium as the fuel of the future.

This is not seen as a spectacular achievement by a developing country to achieve a breakthrough in the field of nuclear fuel economics which opens the way for substitute energy for the poor nations, but as a potential source of nuclear proliferation.

And what is worse, in accusing India of bad faith, some hard-liners in the U.S. have gone to the extent of conjuring disquieting visions of an impoverished country obtaining low-grade enriched uranium from the U.S. under false pretences, than clandestinely reprocessing the wastes to obtain weapons-grade plutonium and then springing a surprise on an unsuspecting world by suddenly leap-frogging into the charmed circle of nuclear weapon States. [as published]

CSO: 5100

CORRESPONDENT QUESTIONS STATE DEPARTMENT ON TARAPUR

Madras THE HINDU in English 17 Feb 81 p 5

[Article by N. Ram]

[Text] "Neither India nor the U.S. can act unilaterally in this matter" is the meaning of the part of the 1963 agreement for nuclear cooperation which "states that no U.S.-origin spent fuel may be reprocessed without a /joint/ [in boldface] U.S.-Indian determination that the provisions of the agreement concerning safeguards may be effectively applied."

And so far as the question of possible reprocessing of non-U.S.-origin fuel is concerned, "it would be inappropriate to comment at this time, in the light of the fact "the Indian Government has not raised this subject with us."

Written responses to this effect by the U.S. State Department to questions submitted by this correspondent suggest it continues to tread very warily on the future of the Indo-U.S. nuclear relationship which is "the subject of review by the new administration and of ongoing confidential discussions with the Indian Government."

Once again, the State Department's formulation appears studiously to avoid language used on India's supposed "obligation to refrain from reprocessing the fuel previously supplied by the United States." (President Jimmy Carter in the message to Congress accompanying his executive order of June 19, 1980), or "U.S. prior consent on the reprocessing of U.S.-origin spent fuel" (Senator John Glenn in his letter to President Ronald Reagon dated February 5, 1981), or the loose term "veto" on reprocessing used by many others in Congress and the media. [as published]

Whether this merely represents a fine legalistic point or is substantive to the handling of the future of the bilateral nuclear relationship is not clear at this stage.

Clarification sought: The questions submitted to the State Department sought clarification of the basic situation of the Indo-U.S. nuclear relationship in these respects.

(A) What is the origin of the U.S. "veto" on India's reprocessing of Tarapur spent fuel, because there seems no mention of it in the 1963 agreement? The agreement speaks of "joint determination" concerning the safeguardability of the reprocessing plant. The question seems to be safeguardability, not whether reprocessing can take place. Would you agree?

(B) Are you aware of a letter by Mr. Myron B. Kratzer (then with the Atomic Energy Commission, later Deputy Assistant Secretary of State) sent to India in late 1968 acknowledging, in effect, that the design furnished by India of the reprocessing facility would allow effective applications of safeguards? Or that the understanding, which the U.S. did not keep, was that a team of U.S. officials would visit the reprocessing facility after its construction to confirm that it followed the design furnished? What has changed since then?

(C) Is it not true that it is the U.S. Nuclear Non-proliferation Act of 1978 which imposes the "prior approval" clause on reprocessing Tarapur fuel, independent of the safeguardability of the reprocessing facility?

(D) Is it not also a fact that the U.S. has relinquished its responsibility of implementing safeguards on spent Tarapur fuel (for the purpose of reprocessing) to the IAEA, under the 1971 trilateral agreement?

(E) Is it any concern of the U.S. in bilateral relations whether India decides to reprocess or not non-U.S.-origin nuclear fuel, and specially Indian-origin spent fuel?

The State Department responded as follows after picking and paraphrasing the questions:

Q: What is the U.S. Government's position on possible reprocessing by India of U.S.-origin spent nuclear fuel?

A: As we have said before, the 1963 U.S.-India cooperation agreement states that no U.S.-origin spent fuel may be reprocessed without a /joint/ [in boldface] U.S.-Indian determination that the provisions of the agreement concerning safeguards may be effectively applied. This means that neither India not the U.S. can act unilaterally in this matter. [as published] The requirement for a joint determination was not removed by the 1971 U.S.-India-IAEA trilateral safeguards agreement. This question, and others related to U.S.-India nuclear cooperation, is the subject of review by the new administration and of ongoing confidential discussions with the Indian Government.

Q: What is the U.S. Government's position on possible reprocessing by India of /Non/-U.S.-origin [in boldface] spent nuclear fuel?

A: The Indian Government has not raised this subject with us. It would be inappropriate to comment at this time.

Vastly overstated: The dry response to questions that are hardly exciting could hold some nuances. One independent specialist reviewing the details of the Indo-U.S. nuclear relationship from a U.S. standpoint told this correspondent the documentation he has seen suggests the language used by Mr. Jimmy Carter, Mr Warren Christopher and in a State Department "fact sheet on Tarapur" "vastly overstated" the control the U.S. has on reprocessing the spent Tarapur fuel.

CSO: 5100

CENTER OFFICIAL INTERVIEWED ON WASTE DISPOSAL

Bombay THE TIMES OF INDIA in English 13 Feb 81 p 5

[Text] A proposal for treating industrial wastes and city sewerage sludge with radioactive wastes has been mooted.

The proposal is said to be under active consideration of the Union government and likely to materialise shortly.

The department of atomic energy has sanctioned it and the beneficiary, the Baroda municipal corporation, has also approved the project in principle.

The financial implication of the proposal is being worked out.

When the plant becomes operative, India will join the select club of nations using nuclear technology to treat sewerage and industrial wastes that have become a serious public health problem.

Treating wastes with nuclear technology yields the best results without any risk to plant operations. The treated wastes could be disposed of safely into the waters.

Energy from Waste

Significantly, the technique also has the advantage of gainfully utilising nuclear wastes. The caesaum-137 isotope in such wastes, which will be utilised to provide energy, has been particularly difficult to dispose of.

Dr. V. K. Iya, director of the BARC's isotope group, considers the proposed project to be a forerunner to far more exciting developments in waste treatment with nuclear technology.

The waste treatment technology assumes added significance in the light of the ambitious nuclear power generation programme envisaging an output of 10,000 MW of 2000 from the present 600 MW.

According to Dr. Nilay Chaudhury, control of water pollution, now in the city, the technology was indisputably efficient but the economics had to be worked out for wider application.

In an interview with this reporter, Dr. Choudhuri said that within the last three years, ten per cent of the 5,000 pollution-oriented medium and large units in the country had introduced satisfactory control systems.

He lamented the fact that only 50 per cent of the population in the 142 class I cities--each of them has a population of over 100,000--was covered by a sewerage system. Only a third of the sewerage generated in them was treated at all, he pointed out.

CSO: 5100

WRITER PRESENTS CASE FOR FAST BREEDER REACTOR

New Delhi PATRIOT in English 18 Feb 81 p 2

[Article by Pradeep Chaturvedi]

[Text] Fast Breeder Reactors are now being accepted as a practical reality, the world over. The enriched uranium fuelled reactor and natural uranium fuelled and heavy water moderated type of reactor, which are now in use, are expected to be edged out by fast breeder reactors in another thirty years. One of the advantages of the fast breeder reactor is that it breeds more material than it consumes.

The recent World Energy Conference has also placed emphasis on developing fast breeder reactors to meet future energy requirements. France has pioneered in this particular field, after being refused uranium enrichment technology by the US in the early fifties. France did not bow down to the US but rather chose to develope its own system (this should actually have been a lesson for India also). [as published]

On current indications, the uranium resources in India can support a natural uranium reactor programme of the order of 10,000 MW(e) over its life time. But these first generation reactors would produce substantial quantities of plutonium which could be used in fast reactors. We are at present building a fast breeder test reactor at Kalpakkam which will be commissioned in the next two years or so. We are also initiating work on the design of a prototype fast reactor with a national power output of about 500 MW. In the 90s, it may be feasible to have two such reactors in operation. But installation of fast reactors would be speeded up in the early part of the next century.

Eventually technologies would be developed for utilising thorium of which we have one of the largest reserves. One possible approach would be that thorium would be irradiated in the blanket of fast reactors and fissile material U-233 produced therein would be used with more thorium in breeder reactors of the thermal kind or of the fast kind. [as published]

The above mentioned remarks of Dr H N Sethna, Chairman of the Atomic Energy Commission, indicate that the fast breeder prototype reactor of 500 MW(e), which was supposed to have been operative by December 1980, as per Dr Sarabai's Ten Year Atomic Energy Profile released in 1970, has been delayed by over ten years. Operation of fast breeder reactor also indicates the onset of third phase of India's atomic energy programme envisaged by late Dr Homi Bhabha, 1954. Dr

Bhabha had in 1954 suggested that by 1980-81 India would have installed capacity of 8000 MW(e) of nuclear power. During the third phase the fast breeder reactors which can utilise vast thorium resources of the country were contemplated to be established.

Later, late Dr Vikram Sarabhai in his Ten-Year Profile mentioned "the programmes slipped badly in relation to targets that were contemplated in the early 1960s. One of the reasons was difficulties in achiving effective coordination of training and personnel needs, R and D facilities and projects, and the complex industrial infrastructure to back up the programme". Dr Sarabhai further suggested a new three-stage programme for the development of atomic power. According to this programme, stage II was to be operative in 1980 to 1985 which would involve breeding of U-233 from thorium in Thermal Fast Breeder Reactor so as to have an inventory of U-233 to go over to a Thorium Breeder Cycle in stage III. Simultaneously, thermal and fast breeder concepts based exclusively on the thorium cycle were to be developed in prototype stage.

The prototype Advanced Thermal Fast Breeder Reactor as well as Fast Breeder Test and Prorotype Reactors were to be constructed in the first stage to gain practical experience of a new technology. Thorium cycle based fast breeders were expected to be operational from 1985 onwards. This shows that programme envisaged by Dr Sarabhai have been pushed back by about twenty years. [as published]

Fast breeder reactor can be designed to produce more fissile material Pu 239 than what is consumed (U-235). Whereas in a thermal reactor, fission neutrons are slowed down by the use of a moderator such as light or heavy water, in case of fast breeder reactor neutrons are not slowed down considerably and the reactor is operated on fast neutrons chain reaction. In order to be able to sustain a fast neutron fission chain reaction it is necessary that the uranium used be highly enriched. Alternatively the enrichment can also be effected by mixing PU 239 with natural uranium. But whether the enrichment required is of weapon's grade or not, depends on the detailed design of the reactor. Once the initial fissile inventory is provided for commissioning a fast-breeder reactor it does not require, in principle, any more fissile fuel as input. On the contrary, the reactor acts as a supplier of new fissile fuel to construct more fast reactors.

The possibility of breeding has a tremendous impact on the overall efficiency of utilisation of the potential energy available in natural uranium. It was observed earlier that only U 235 constituting 0.7 per cent of the naturally occurring uranium is normally fissionable in a reactor. Taking into account in Situ production of plutonium and its incore consumption to some extent, it may be stated that if only thermal reactors are constructed and operated, less than one per cent of the uranium mined would be fissioned and utilised.

However, if breeder reactors which in effect run on the fertile isotope U 238 are used then about 50 to 60 per cent of the mined natural uranium can be burnt to generate tremendous amount of energy. Breeder reactors thus increase the energy potential of a given uranium resource base by more than 60 times compared to what is possible with thermal reactors alone using an open ended cycle system.

India has particularly vast deposits of thorium. Unlike uranium, which has a small but readily fissile component in the form of U 235, thorium occurs in nature as pure Th-232 and is a fertile material similar to U-238. Th-232 on capturing a neutron gets converted to U-233 which is also a fissile isotope like U 235 and Pu-239. U-233 also has fissioning property better than U-235 and can be readily used both in nuclear reactors for power generation and in nuclear expolsions. [as published] This leads to the concept of a Th-U 233 fuel cycle which may be compared with U 238-Pu-239 fuel cycle.

India has vast thorium resources, and that is why the Atomic Energy Commission had contemplated a programme which would, in the third stage, make India self-dependent in the field of nuclear power mainly based on thorium cycle, but achievements are far from satisfactory. Dr Bhabha while delivering the lecture on "Economics of Atomic Power Development in India and the Indian Atomic Energy Programme" on 6 September, 1957, in Dublin, said "the total reserves of thorium in India amount to over five lakh tonnes in a readily extractable form while the total known reserves of uranium are less than one-tenth of this. The aim of a long-range atomic power programme in India must therefore be to base the nuclear power generation as soon as possible on thorium rather than uranium".

The latest reports estimate a total of thorium resources in India to be 320,000 tonnes and the total of uranium resources to be 52,000 tonnes. The energy potential from various nuclear deposits in India are compared below:

(i) Uranium in thermal reactors--7.2 trillion KWH(e); (ii) uranium in fast reactor 208 trillion KWH(e); and (iii) thorium in fast reactor 1280 trillion KWH(e). This shows that the total potential of energy availability from fast reactor is 1488 trillion KWH(e) as compared to 7.2 KWH(e) by using uranium in thermal reactors. As a comparison the total energy potential from coal deposits in India is only 160 trillion KWH(e). This shows that the potential of fast breeder reactor based on thorium cycle is 800 per cent of total energy potential from coal.

India is not geared up to exploit this vast energy potential available from indigenous resource. So far thorium cycle has not been developed by any other atomic reactor manufacturers. They do not think it necessary as thorium reserves in any of these countries is very poor. They are basing everything on uranium cycle technology. In absence of R & D work being done in any developed nation it becomes all the more necessary for the Atomic Energy Commission to develop thorium cycles suitable for fast breeder reactor at an early date.

The Bhabha Atomic Research Centre has a challenge of developing a proper thorium cycle in whose absence we will not be able to tap this vast energy potential available in this country.

CSO: 5100

CANADA

TOKAMAK UNDER CONSTRUCTION NEAR MONTREAL

Montreal LE DEVOIR in French 10 Feb 81 p 6

[Article by Gilles Provost]

[Text] Starting in 1983, the Varennes tokamak will (at last) make it possible for Canada to make a meaningful contribution to the international research effort to domesticate, for the first time, the fantastic energy of thermonuclear fusion, DEVOIR was told by Mr Richard Bolton, who directs this project for the Hydro-Quebec Research Institute (IREQ).

Thermonuclear fusion is the source of energy for the stars and our own sun. Humanity has never succeeded in utilizing it for anything but the terrible "H-bombs" (hydrogen bombs). The whole challenge now consists in liberating that formidable energy in less destructive fashion, in a power-generating plant for example.

Unlike the "A-bombs" and ordinary nuclear power plants which "burn" heavy and rare fuels (uranium and plutonium), nuclear fusion uses as fuel the most abundant chemical element in the universe: hydrogen. In practice, this energy source is inexhaustible.

The most promising machines, in the view of those who are trying to produce in the laboratory conditions similar to those that exist in the heart of stars, are tokamaks. These devices, of Soviet origin, shaped like a doughnut (toroidal), utilizing a strong magnetic field to bottle the material heated up to several millions of degrees Celsius.

The challenge then is to maintain it at sufficient density and temperature for a long enough time.

According to Mr Bolton, neither Hydro-Quebec nor Canada have the resources to rival the superpowers who are trying to reach records in temperature, pressure, and density with the help of bigger and bigger tokamaks.

But on the other hand, he says, an eventual move to a commercial reactor will require continuous operation and a direct coupling with an electrical network. Now no apparatus has ever attacked those problems. The Quebec tokamak will be the first to study those especially crucial aspects which must receive world attention as soon as a nuclear fusion reaction has finally been produced in the laboratory.

The $20 million apparatus that Hydro-Quebec has already undertaken to build in the basement of its Varennes laboratory will be a center for national research, financed as such by the Canadian Government.

For the first time ever, there will be work with almost continuous discharges lasting half a minute, instead of isolated discharges on the order of one thousandth of a second. This will at last make it possible to study the accumulation of impurities in the "plasma" (ionized gas at very high temperature) and the reactions that are produced then with the surfaces of the chamber.

Entirely designed in Quebec, the new Varennes tokamak can be completely disassembled (another unique feature) in order to permit the interior of the chamber to be changed easily and to facilitate analysis of a number of different substances.

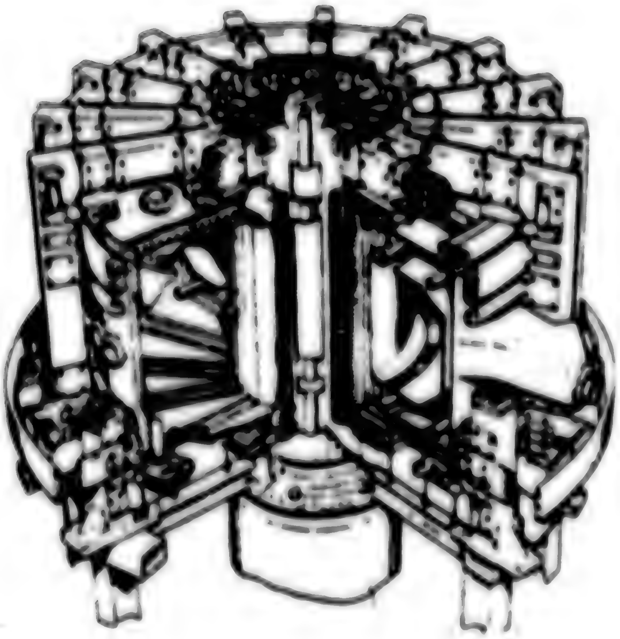
The other big research priority, according to Mr Bolton, will be the development of measuring systems that will make it possible to determine with precision what is happening inside the apparatus without disturbing its operations. This aspect is crucial if one wants eventually to have a viable commercial reactor.

Finally, the Varennes tokamak will also be unique in that it will be directly connected to the Hydro-Quebec network. Machinery of this kind consumes an enormous quantity of energy, on the order of 25 megawatts at Varennes, and several hundred megawatts for the bigger tokamaks under construction at this time.

Since such machines require such big quantities of energy for only a very short time, foreign countries have always opted to use accumulators with a capacity for quick discharges, and have never dared to pull such charges directly from a commercial network.

In the case at hand, the situation is very different, since the Varennes tokamak will be installed in the basement of a veritable concrete casemate designed specially for the study of super short-circuits that could be produced in an 18,000-megawatt network such as Quebec's. Already short discharges draining hundreds of megawatts have been achieved without major problems. The supply system and the expertise required are already there. That simplifies the problem and to that extent reduces the costs of construction.

According to Mr Bolton, simply installing the new tokamak in an already built edifice (the basement has already been renovated to receive the machine) will make it possible to save several million dollars. Moreover, IREQ is already equipped to protect its personnel from accidents that are possible when one is working with such power levels and high levels of tension. The tokamak will never become radioactive (not the one at Varennes, at least) but protection will have to be provided against the X-rays that will be released.



Here in cross-section is a diagram of the tokamak on which construction is about to begin in the basement of the IREQ Super Power laboratory in Varennes. Conceived by Quebecois, this machine for thermonuclear fusion research measures approximately 5 and 1/2 feet in height and 10 feet in exterior diameter. Its small size will not prevent it from consuming 25 million watts of power when in operation.

Finally, it is anticipated that eventually supplementary heating sources will be added to the tokamak, whether by injection of neutral particles or by electromagnetic radiation. Normally, the plasma created inside the apparatus is only heated by the current required for the magnetic field that holds in the material at the center of the torus. However, the heating efficiency decreases as the temperature goes up, to such an extent that one must add auxiliary heating to augment performance. For the time being, it is out of the question to equip the apparatus with superconductive cryogenic coils. That equipment is necessary to create very powerful magnetic fields, but the Varennes tokamak is not designed to set new records.

According to Mr Bolton, it would be much simpler to build a new and more powerful tokamak, if one ever wanted to obtain performance greatly superior to what is anticipated at this time.

A Market of More Than a Billion Dollars a Year

The construction of the Varennes national tokamak represents an invaluable opportunity for Canadian industry, which can thereby acquire invaluable expertise in high-technology fields, DEVOIR was told by Mr Richard Bolton, project coordinator at the Quebec Electricity Research Institute (IREQ).

The promoters of the project in fact attach great importance to the probable industrial side-effects, he said. It is already anticipated that the Canadian National Research Council (CNRC), which is financing half the construction of this national laboratory, will use its own industrial innovation assistance programs to give a boost to industries that want to profit from the opportunity.

All by itself, construction of the big thermonuclear fusion research equipment represents a market of more than $1 billion per year, Mr Bolton emphasizes. Also, the expertise acquired in the construction of a tokamak could also be of use in several related fields.

As there is one machine only, enterprises will have a part to play in the detailed design of the apparatus, rather than simply filling orders drawn up by others, he believes. Often, overseas, it has been observed that small firms profited more than the big ones from opportunities of this kind, because they invested more effort.

Finally, Mr Bolton maintains that construction of such an apparatus at Varennes should give Quebec enterprises a powerful competitive edge: distance is a major handicap for an enterprise that must keep tabs on the status of the project on a daily basis.

One fact to be noted: the Varennes tokamak project represents the result of many years of efforts and pressure on the part of a rather exceptional consortium which includes both public, para-public and private institutions.

It includes, in fact, IREQ (Hydro-Quebec), INRS-Energy [National Institute of Scientific Research [France]] (University of Quebec), the University of Montreal, the nuclear engineering consulting firm Canatom, and the MPB Technologies company (which includes the RCA researchers who remained in Montreal when the company moved to Ottawa. For several years, the Valcartier military research center was also in the group, but the Canadian Government is now represented by the national research council (CNRC) which is supplying half the funds. Finally, there is talk of establishing closer collaboration with Atomic Energy of Canada Ltd (EACL).

Already the project includes some fifteen professionals on an almost fulltime basis, and the design of the apparatus is already far enough advanced that Hydro-Quebec has been able to prepare the site. Within the next 2 years, the personnel should double, without even taking into account the foreign researchers who will come to continue their work with us.

Above and beyond construction costs, estimated at about $20 million, the operation of this national laboratory should cost around $4 million per year thereafter. According to Mr Bolton, it will perhaps be difficult to have the Canadian share of instrumentation and diagnostic equipment required to reach higher than 50 percent, but the Canadian share of the electrical supply and the construction of the apparatus itself should climb to 80 percent. Finally, the management services for the structures will all be provided by Canadians.

According to the estimates given to the Canadian Government, the project should increase the expertise of Canadian firms in management of high-technology projects, in the design of magnetic or pressurized systems, in techniques of analysis of mechanical or thermal stress, etc.

Their study of the CERN (European Center for Nuclear Research) model has caused promoters of the project to believe that it could have an industrial "fallout" effect three or four times greater than actual expenditures; expansion of markets, development of new products, improvement of existing products because of new expertise, reduction in the cost of industrial research (partially financed as part of the project), free publicity, etc.

These spillover effects could be increased by the avant-garde characteristics of the Varennes tokamak: the most powerful machines of tomorrow will probably call on expertise in which Canada will have a sure lead. In that way, enterprises that were involved in design or construction of the Quebec apparatus could be called on to cooperate in other projects abroad, later on.

It is even anticipated that cooperation agreements with foreign laboratories could include the participation of Canadian and Quebecian industries in projects of these American, European, and Japanese laboratories.

"One thing is certain," says Mr Bolton, "we intend to do everything possible so that Canadian firms have priority and can really reap long-term benefits from the investment represented by the national laboratory for nuclear fusion research."

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CSO: 5100

HEAVY WATER FROM USSR, TALKS ON ENRICHED URANIUM

Buenos Aires CLARIN in Spanish 14 Jan 81 p 4

[Text] Yesterday the National Atomic Energy Commission (CNEA) issued a communique confirming that the 5 tons of heavy water bought from the USSR are already in this country.

The national organization added that "the heavy water will be used in the future to replenish the Atucha I Nuclear Powerplant."

It was pointed out that "as usual, the heavy water (bought from the USSR) has been put under the IAEA safeguards system."

It was also observed that "in the Atucha I reactor, about 315 tons of heavy water are used as moderator and coolant" and "about 1.5 tons are replenished annually."

The CNEA thus confirmed several stories that had been circulating about the purchase. These stories had been echoed by the press and in an issue of JORNAL DO BRASIL.

Evaporation

CNEA officials told EL CLARIN that while the heavy water coolant is not used up, every year about 1/2 ton of it evaporates through the chimney and another 1/2 ton is lost in maintenance operations.

They said that the first Argentine nuclear plants is designed to lose 2.5 tons annually, but it has never lost this much since it started operating, except for 1977, when 4 tons were lost because of general maintenance operations.

Heavy Water for Embalse

The second Argentine nuclear powerplant, the Embalse de Rio Tercero plant, now under construction, will also use heavy water and it was reported that this element will be leased from Canada.

In this case, Argentina had the option of buying all the heavy water needed for the first load, but decided against it since plans to produce heavy water in the country are well underway.

In this field, there are two projects in progress. One of them is the installation at Arroyito, Neuquen, of a "turn-key" plant bought from the Swiss company Sulzer Brothers after international bids were submitted last year.

The facility, already under construction, will be completed in 1982 and will be able to produce more than 250 tons annually.

The second project is completely Argentine and under the direction of the CNEA, which has developed all the necessary expertise in order to become independent, inthis field, of the international market, which is extremely restricted for complex reasons.

The Commission is almost ready to complete the development of a module of its own design that will permit production of 80 tons annually, in addition to what will be produced with Swiss technology at Arroyito.

Atucha II

The third Argentine nuclear plant, Atucha II, will be supplied by a German-Argentine company using German technology. Its initial need of 600 tons will be supplied by the local market.

Nevertheless, sources indicated that until industrial production starts nationally, it will be necessary to continue purchasing heavy water from the USSR in order to complement the available reserves of the atomic plant already in operation or of those soon to be functioning.

It was also said that negotiations are in progress with the Soviets for the purchase of enriched uranium to be used in experiemntal reactors, since the reactors of our nuclear powerplants use or will use natural uranium.

Background

Since early last year there were signs that the intensive Argentine-Soviet commercial exchange would be increased by collaboration in the nuclear field.

The national need to develop nuclear power as an energy source was faced with the difficulties encountered in obtaining supplies from the West due to the almost insurmountable safeguard clauses imposed by the "Atomic Club" or to U.S. measures and the pressures that country brought to bear upon other producers.

CNEA president, Vice Admiral Carlos Castro Madero, denounced on several occasions last year the existence of "political and economic interests that try by all means to keep Brazil and Argentine from independently developing nuclear capabilities that will enable us to eliminate our present dependence on foreign markets."

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CSO: 5100

GOVERNMENT ADOPTS NEW RADIOACTIVE MINERALS POLICY

La Paz PRESENCIA in Spanish 17 Feb 81 p 8

[Text] The government is to promote the prospecting, exploration, evaluation and quantification of new radioactive mineral deposits. For that purpose it is lending its full support to the Bolivian Nuclear Energy Commission (COBOEN).

This measure is contained in the paper on the new mining and metalworking policy that was drawn up by the Ministry of Mining and Metalworking's technical agencies after consulting with private mine operators and representatives of the industry's cooperatives.

The paper states that one of the real possibilities of diversifying mining and metalworking production consists of promoting the mining and processing of radioactive ores.

It adds that, due to their high strategic and commercial value, radioactive minerals constitute a viable alternative that would be a significant contribution to the development of the industry.

"Within its economic limitations and with the technical and economic collaboration of specialized international agencies, the Bolivian Nuclear Energy Commission is developing exploitation of the Cotaje uranium deposit in the department of Potosi."

In the field of ore-processing, it launched operations with a pilot plant, later going on to erect a uranium-ore concentration plant which operates on a semi-industrial scale, the same one that was expanded in September 1980.

The radioactive minerals policy is based on the following guidelines:

"The promotion of the prospecting, exploration, evaluation and quantification of new radioactive deposits.

"The exploitation and extraction of radioactive minerals will be effected through utilization of the appropriate safety measures and in conformity with international standards.

"The processing of radioactive ores will be achieved through the use of modern technology.

"The marketing of uranium products will be the responsibility of the state.

"The Bolivian Nuclear Energy Commission is the decentralized institution responsible for carrying out the guidelines for the radioactive minerals policy.

"For the purpose of intensifying the production of radioactive minerals and due to the high cost entailed in prospecting and exploration operations, as well as the scarcity of funds and the need for obtaining a specialized technology, the following actions will be taken:

"Government backing for the Bolivian Nuclear Energy Commission through timely and appropriate provision of funds.

"Promotion of the signing of operations contracts to obtain a technology specialized in funding in order to discover, exploit and process radioactive ores.

"Back the construction of an industrial-scale uranium-ore concentration plant.

"Design and support the carrying out of a national radioactive minerals program."

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CSO: 5100

BRIEFS

URANIUM MINE--Oaxaca, 9 Mar (EFE)--The largest uranium mine in the country, with reserves estimated at more than 10,000 tons, was discovered near here and exploitation will begin within 2 months, it was announced officially today. Guillermo Vizcaino Murray, director of Mexican Uranium Enterprise (URAMEX), announced that the state enterprise will invest more than $29 million in the mine. He added that more than $132 million is being invested in exploration and exploitation throughout the country of this radioactive metal, and that of this amount $29 million is assigned to Oaxaca state, in the southeastern part of the country. He said Mexico will use uranium from now until the year 2000 to produce 20,000 kw. "This will be 25 percent of the total electricity produced in the country," Vizcaino Murray pointed out. Mexico is trying to find uranium that would put its reserves at 20,000 tons by the end of 1982. However, it is believed that Mexico's proven and potential reserves are much higher than that. The capital of Oaxaca state is Oaxaca, 508 km south of Mexico City. [Text] [PA100207 Madrid EFE in Spanish 2213 GMT 9 Mar 81]

CSO: 3010

VEIL URGES EC HEARINGS ON NUCLEAR ENERGY

Paris LE MONDE in French 22-23 Feb 81 p 12

[Article by M. A.]

[Text] "Public information on nuclear problems could result from extensive Parliamentary hearings, as takes place in the United States and took place in France before enactment of the law on voluntary interruption of pregnancy."

This statement was made Friday 20 February in Paris by Mrs Simone Veil, chairwoman of the Council on Nuclear Energy Information, in her concluding remarks at the Council's presentation of its second annual report. The remark was not in the release that had been prepared for the press. It supports--even though Mrs Veil is thinking in terms of committee hearings rather than plenary debates--the demands being voiced by the Parliamentary opposition. It will certainly not be appreciated by the Ministry of Industry, which has hardly been keen on providing the members of Parliament with information that has not first been carefully screened by the administration.

It is also not certain that another of Mrs Veil's remarks will be unanimously relished. The chairwoman indicated that the Council's report is "an administrative innovation," in the sense that it contains the contradictory viewpoints expressed by the Council's various interlocutors: top officials of the nuclear energy program, but also union leaders, representatives of ecological associations, scientific researchers. It is the diversity of the views expressed and of the arguments advanced that makes this report interesting. Mrs Veil indicated at this presentation that many government directives have followed the recommendations of the council she heads.

Thus, the Council's work has been thorough, covering such issues as public-interest informational procedures, the carrying out of impact studies, and even costs and harmful effects of energy production by different methods. The Council several times modified its program to study a problem of present-day interest: the American Three Mile Island accident, the problem of fissures, waste stockpiling projects at Saint-Priest-la-Prugne (Loire). In the latter case, which was examined after the annual report had gone to press, the Council decided to disseminate the minutes of its meetings without awaiting the next annual report.

The Council found that a special effort must be made to inform certain categories of the population: doctors who will have to care for and perhaps reassure the population in case of accident, teachers who are educating future generations.

Lastly, the Council raises the issue of the public's lack of adequate knowledge in dealing with public-interest surveys. These surveys seem to make it a point that the public not be informed that the surveys have been preceded by many studies; when the EDF [French Electric (Power) Company] proposed, in September 1978, the building of a power plant at Plogoff, it was after having compared that site with five others in the course of studies that had begun 3 years earlier.

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NUCLEAR POWER CAPACITY TO RISE 35 PERCENT IN 1981

Paris ELECTRONIQUE ACTUALITES in French 13 Feb 81 p 4

[Text] In 1981 France will increase its nuclear power capacity by 35 percent, from 12,856 to 17,376 megawatts, according to the ministry of industry.

The power of EDF's [French Electric Company] nuclear power plants should triple between now and 1985 with 38,223 megawatts and quadruple between now and 1990, with 66,400 megawatts.

In 1980, nuclear energy accounted for 6.41 percent of France's total energy production; its share should rise to 30 percent in 1990, according to government estimates.

On 31 December 1980, France's nuclear capacity included 23 installed units (those which have already gone critical--produced a chain reaction) with 15,596 megawatts spread over eight units of "old" nuclear plants (those which started operating before 1972), one breeder reactor, the Phenix, and 14 PWR [Pressurized Water Reactors] units of 900 megawatts each. Only 20 units were in industrial operation, with a total capacity of 12,856 megawatts.

29 units with a total power of 30,190 megawatts were under construction at the end of 1980; these included 18 units of 900 MW, 10 of 1300 MW, and one unit of the Super-Phenix breeder reactor, which is scheduled to start service in 1983.

Construction of four new units should begin in 1981, according to the ministry of industry, representing a total of 4,695 MW: two of 1,300 MW for which Framatome has already received firm orders, and two options on a 900 MW reactor and a 1,300 MW reactor. Their start of service is planned for 1986 and 1987.

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